



Annual 2008 VA/DoD Joint Venture Conference

EL PASO (WBAMC/ELPVAHCS)

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Agenda



-
- Project Background
 - Initial Functional Requirements
 - Approach
 - Expectation vs. Outcomes
 - Imaging Architecture
 - How Does It Work?
 - Imaging Viewers
 - Questions



National Defense Authorization Act (NDAA) Activities



- William Beaumont Army Medical Center/El Paso VA Health Care System
 - Extensive amount of NDAA work accomplished over last four years
 - Assistance with design/testing with Bidirectional Health Information Exchange (BHIE) and other enterprise level products (e.g. LDSI, CHDR)
 - Bidirectional exchange of medical images was approved for final phase of NDAA business plan in April 2006
 - Prototype developed at the enterprise with local input and testing



National Defense Authorization Act (NDAA) Milestones



- Phase 1 – September 2006-May 2007 (Completed)
 - Bidirectional exchange of medical images (referential) and related text information between the VA VistA Imaging Exchange and the DoD's Medical Image Viewer (CR, DX, and CT)
- Phase 2a – May 2007-September 2007 (Completed)
 - Exchange of diagnostic quality images and MRIs
- Phase 2b – October 2007- September 2008 (Underway and On Schedule)
 - Additional modalities
 - Mammography – on Hold
 - Ultrasounds - Testing underway
 - Secondary Capture – If time permits
 - Six additional sites



National Defense Authorization Act (NDAA) Milestones



- HEC IM/IT Work group Approved Expansion – October 2007-September 2008
 - Extension of testing the NDAA prototype to six (6) additional sites;
 - Evans Army Community Hospital & Denver VAMC
 - Naval Health Clinic Great Lakes & North Chicago VAMC
 - Landstuhl Regional Medical Center
 - VA Polytrauma Centers (Richmond and Tampa)
 - NCA-Walter Reed Army Medical Center, National Naval Medical Center, and Malcolm Grow Medical Center & Washington DC VAMC
 - Keesler Medical Center & VAMC Biloxi
- NDAA Project Closeout in El Paso
 - 30 September 2008



Initial Functional Requirements



-
- The VA and DOD will initially exchange DICOM radiology images for CR, DX, CT, MR modalities. More types will be added over time (e.g.. US, SC, etc)
 - Three quality levels: thumbnail, reference, and diagnostic.
 - Thumbnails use the JPEG file format; reference and diagnostic images use DICOM JPEG 2000 file format.
 - Thumbnail and reference images apply a lossy compression; diagnostic images uses lossless compression ratios.
 - Images and metadata will be cached to improve the performance of subsequent requests.
 - Web browser viewer capability will be developed for the DoD
 - Minimal user interface changes to the VA Clinical Display



Approach

- Uses the existing BHIE framework
 - Proven technology that is already in production.
 - Solves patient cross agency identification.
 - Has necessary approvals to work in both the VA and DOD enterprises.
 - Addresses HIPAA requirements between the VA and DOD enterprises.
- Image Enhance BHIE Framework (BIA)
- Integrates with VistA Remote Image Views
 - To the Clinical Display user, the DOD appears as just another medical facility.
- Reduced development time and cost



Expectations/Outcomes



Expectation

- Transfer of CR, DX, CT, MR, MG, US, and SC images.
- Transfer times of 15 - 45 seconds for a normal X-ray.
- Up to 3 min transfer time for a CT.
- Process will need a high end server to process images locally.
- Possible slowdown of other services due to high bandwidth use by this process.

Outcomes

- Transfer of CR, DX, CT, MR, US
- Transfer time of normal x-rays was 5 - 20 seconds.
- CT transfer times is 1 second per image (max). Total transfer time will vary by study size.
- Server device can be scaled down to be more affordable.
- Affect to other programs due to bandwidth utilization was minimal.



Prototype Imaging Deliverables



- DoD (WBAMC) –

The PACSIntegrator (PI) gateway service:

- New hardware server to support imaging services
- Request and cache images from the VA
- Serve DoD Images to the VA

Web-based medical image viewer (MIV)

- VA (El Paso HCS) –

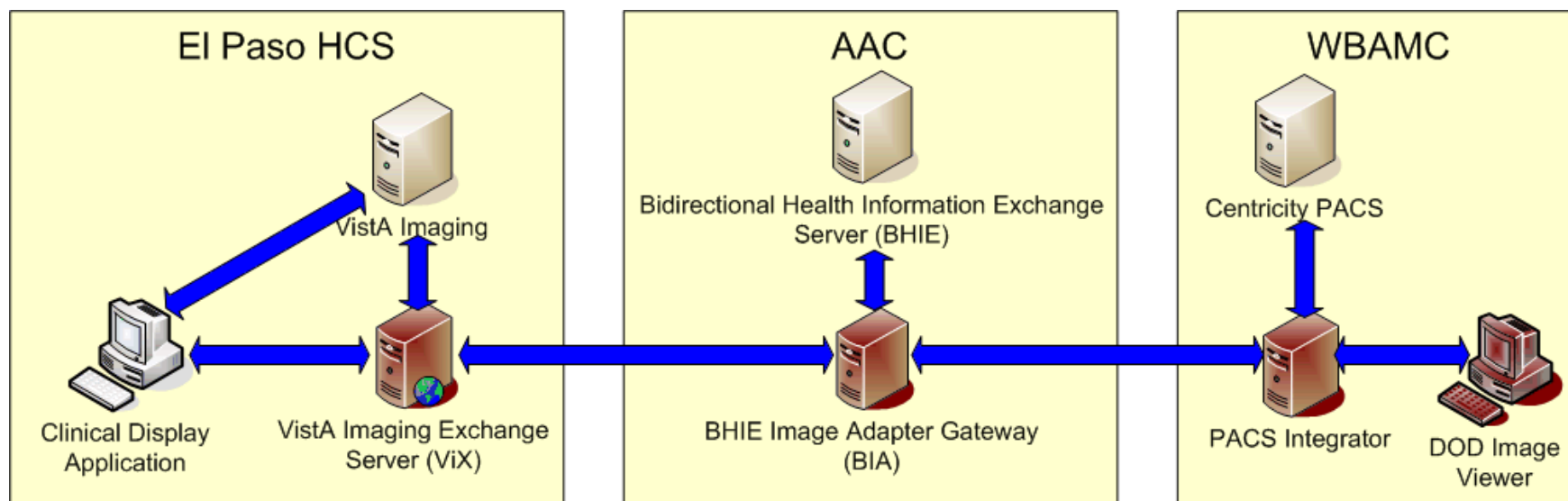
The VistA Imaging Exchange (ViX) gateway service:

- New hardware server to support imaging services
- Request and cache images from the DOD
- Serve VA images to the DOD.

A modified version of the Clinical Display application that can use the ViX to retrieve DOD Images. This work includes other enhancements to the VA's clinical display software.



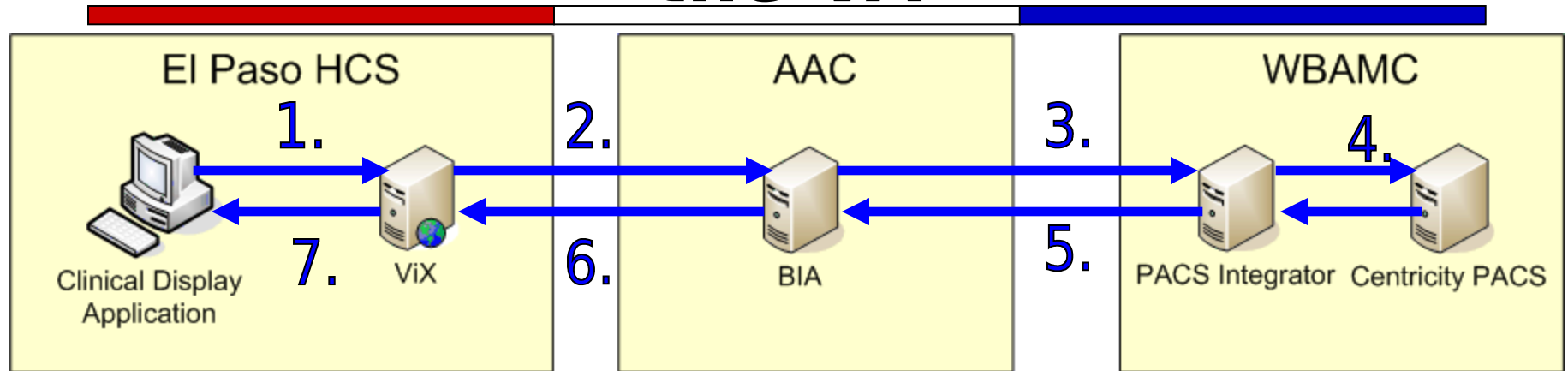
Imaging Architecture



New components are shown in red



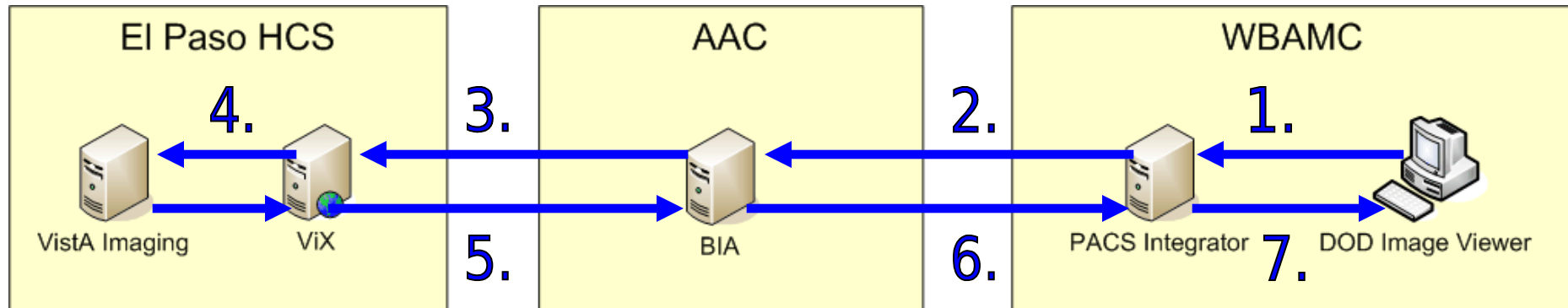
How it works: Viewing DOD Images from the VA



1. Clinical Display User issues an image request.
2. The ViX forwards the request to the BIA at the VA AAC.
3. The BIA forwards the request to the PACS Integrator at the WBAMC.
4. The PACS Integrator retrieves the image from DOD PACS system and caches it.
5. After compressing the image, the PACS Integrator returns the image to the BIA.
6. The BIA returns the image to the ViX which caches it.
7. The ViX returns the image to the Clinical Display User for viewing.



How it works: Viewing VA Images at the DOD



1. The DOD Imaging User requests an image.
2. The PACS Integrator forwards the image request to the BHIE Image Adapter (BIA) in the VA AAC.
3. The BIA forwards the request to the ViX at the El Paso HCS.
4. The ViX queries VistA to locate and retrieve the image.
5. The ViX compresses and DICOM wraps the image (if needed) which is then returned to the BIA which caches it.
6. The BIA returns the image to the PACS Integrator.
7. The PACS Integrator returns the image to the DOD Imaging User for viewing.



VA DIGITAL IMAGING VIEWER



What the Clinician Sees



VISTA Imaging Display : BHIEPATIENT,B TWO (10.4.229.30) ...

File Options View Reports System Manager Help

Patient: BHIEPATIENT,B TWO 4 of 4 Images match Filter: " Clin All "

10/25/21 000-00-7937 YES SC VETERAN

Connect All ALASKA VAHSRO(X) SALT LAKE CITY HCS(X)

ELP Patient: BHIEPATIENT,B TWO

Buttons show facilities where patient has been seen. Click to connect.

Image List: BHIEPATIENT,B TWO

File Options Tools Help

Clinical All Admin All #All 2 yr #All #Admin 10-10EZ All #Clin 2 yr #Admin All #Clin All #Rad All

4 of 4 Images match Filter: " Clin All "

ID# 154906493 [EL]	Item	Site	Note Title	Proc DT	Procedure	# Img	Short Desc	Pkg
	1	ELP		12/05/2007 18:06	RAD US	19	ECHOGRAM OTHER UNLISTED	RAD
	2	ELP		08/03/2007 19:50	MR	63	MRI, SHOULDER W/O CONTRAST	RAD
	3	ELP		03/21/2007 17:34	RAD CR	6	HIP 2 OR MORE VIEWS	RAD
	4	ELP		03/21/2007 17:13	RAD CR	2	CHEST 2 VIEWS PA&LAT	RAD

Study Location Study List

Group ID# 154906493

BHIEPATIENT,B TWO 000-00-7937 86 yr. old male

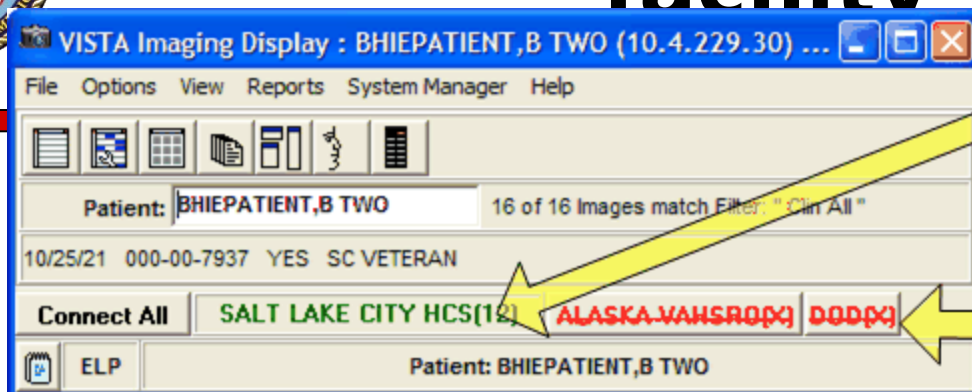
Exm Date: MAR 21, 2007@17:34

Radiology Report

4 ID# 154906493 [ELP]HIP 2 OR MORE VIEWS RAD CR 03/21/2007 17:34

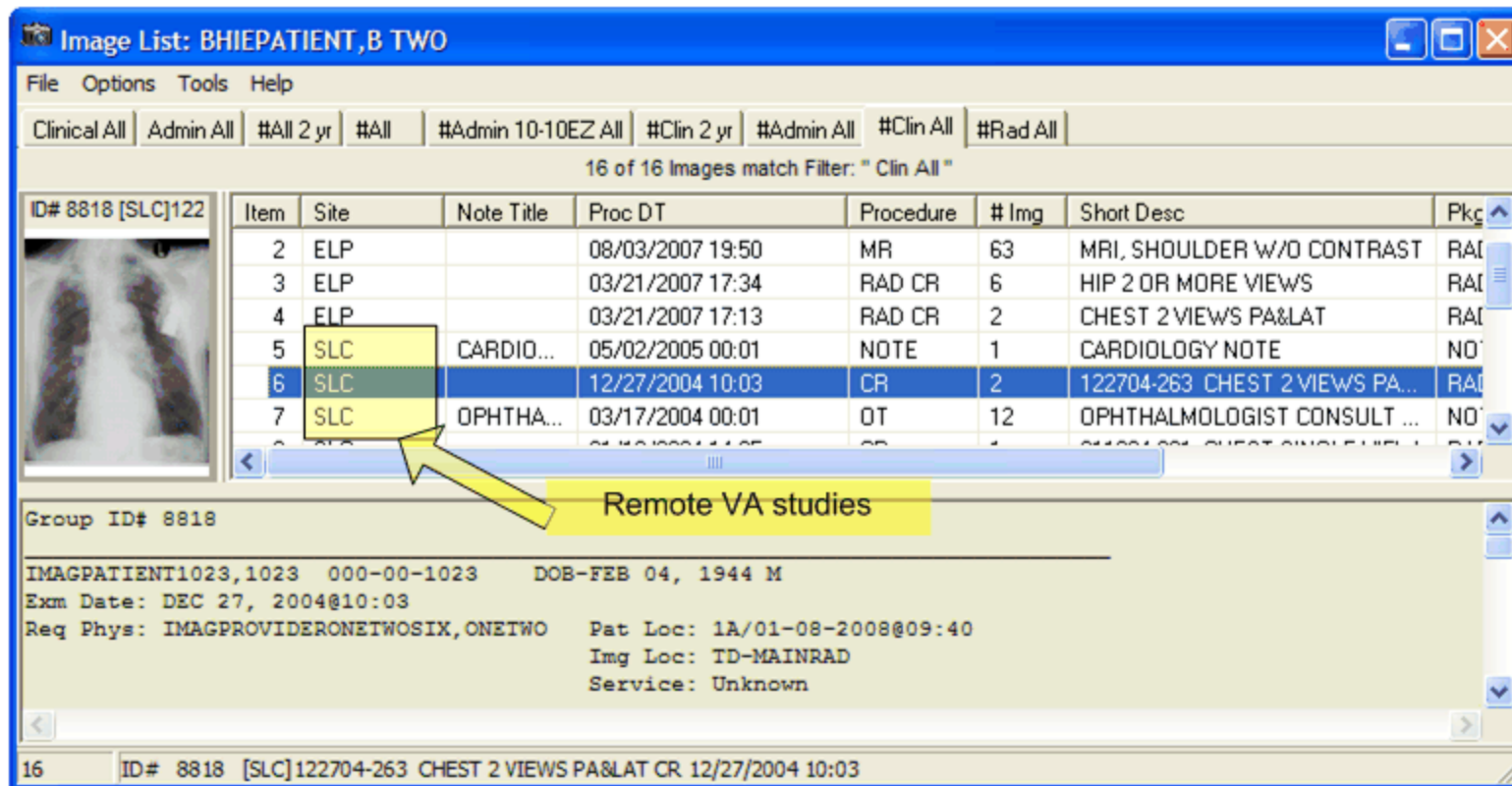


Connecting to a remote VA facility



Remote VA facility connected

DoD studies available. Click to connect.



Remote VA studies



Connecting to the DoD



VISTA Imaging Display : BHIEPATIENT,B TWO (10.4.229.30) ...

File Options View Reports System Manager Help

Patient: BHIEPATIENT,B TWO 20 of 20 Images match Filter: " Clin All "

10/25/21 000-00-7937 YES SC VETERAN

Connect All SALT LAKE CITY HCS(12) DOD(4) ALASKA VAHSROCK

ELP Patient: BHIEPATIENT,B TWO

DoD connected

- Seamless integration
- No learning curve for Clinician

Image List: BHIEPATIENT,B TWO

File Options Tools Help

Clinical All Admin All #All 2 yr #All #Admin 10-10EZ All #Clin 2 yr #Admin All #Clin All #Rad All

20 of 20 Images match Filter: " Clin All "

ID# urn:vastudy:20	Item	Site	Note Title	Proc DT	Procedure	# Img	Short Desc	Pkg
	4	DOD		04/02/2007	CT	76	CT, ABDOMEN/PELVIS W/O/W C...	
	5	ELP		03/21/2007 17:34	RAD CR	6	HIP 2 OR MORE VIEWS	RAI
	6	ELP		03/21/2007 17:13	RAD CR	2	CHEST 2 VIEWS PA&LAT	RAI
	7	DOD		12/19/2006	RF	6	HYSTEROSALPINGOGRAM-PG	
	8	DOD		11/30/2006	CR	3	ABDOMEN SERIES, ACUTE	
	9	SLC	CARDIO...	05/02/2005 00:01	NOTE	1	CARDIOLOGY NOTE	NO

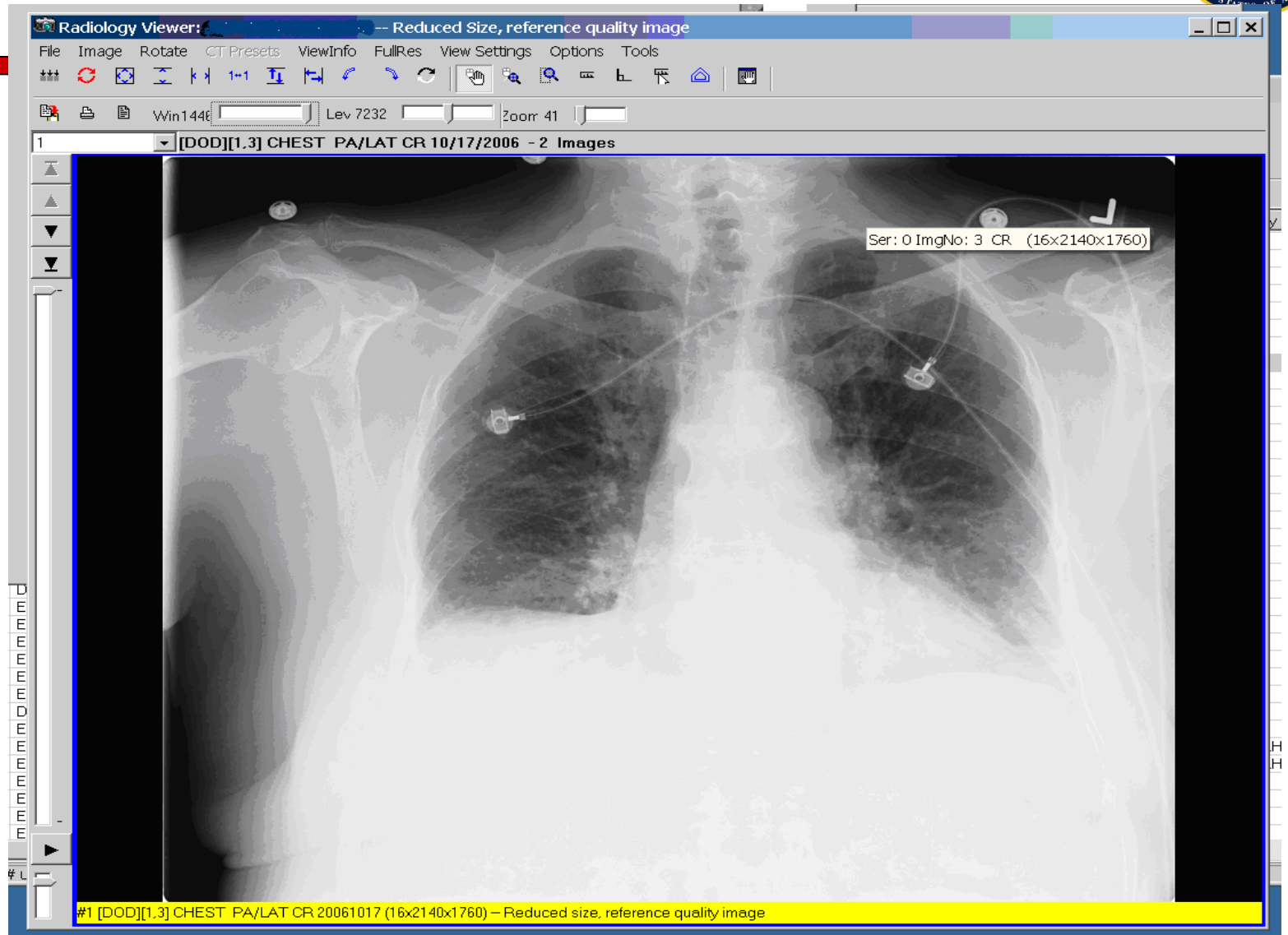
Report not available at this time.

DoD studies

ID# urn:vastudy:200-OVZG40TCNBUWK43UOVSHSOTSOAYDEXZQGEZDIX3SM4YDCLLFMQZTSN3DMFSS2ZLGG5SS2NBQMU4S20JRMQZC2YJYG

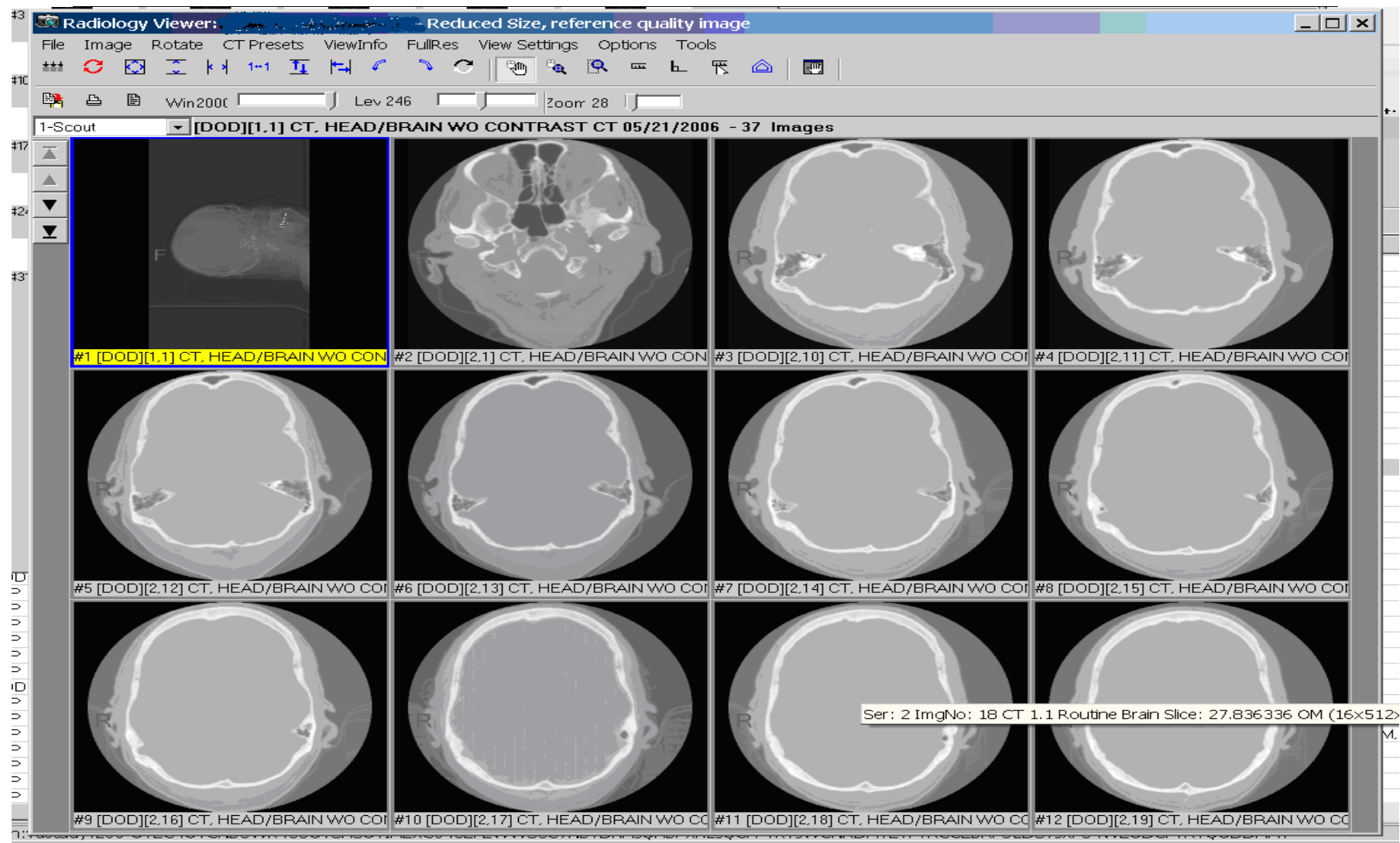


CR Image





CT Image (Single or multi)





DOD DIGITAL IMAGING VIEWER



Medical Image Viewer Login




The DoD Medical Image Viewer uses the same user credentials as AHLTA/CHCS

Medical Image Viewer - WBMAC - Login - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address <http://amedapwbamc0060/login.aspx?ReturnUrl=%2fDefault.aspx> Go

Back Forward Stop Search Favorites

 **MEDICAL IMAGEVIEWER**

MIV Login

User Credentials

Username:


Password:

Security

☒ **This is a public or shared computer**
Select this option if you are using a public computer. Be sure to log off when you have finished and close all windows to end your session.

☐ **This is a private computer**
Select this option if you are the only person who uses this computer. You will be allowed a longer period of inactivity before being logged off.
Warning: By selecting this option, you confirm that this computer complies with your organization's security policy.

This is a Department of Defense Computer System. This computer system, including all related equipment, networks, and network devices (specifically including Internet access) are provided only for authorized U.S. Government use. DoD computer systems may be monitored for all lawful purposes, including to ensure that their use is authorized, for management of the system, to facilitate protection against unauthorized access, and to verify security procedures, survivability, and operational security. Monitoring includes active attacks by authorized DoD entities to test or verify the security of this system. During monitoring, information may be examined, recorded, copied and used for authorized purposes. All information, including personal information, placed or sent over this system may be monitored. Use of this DoD computer system, authorized or unauthorized, constitutes consent to monitoring of this system. Unauthorized use may subject you to criminal prosecution. Evidence of unauthorized use collected during monitoring may be used for administrative, criminal, or other adverse action. Use of this system constitutes consent to monitoring for these purposes.

 **Medical Image Viewer 1.3.1.100**
Complete Professional Services (CPS)

Done Local intranet



Medical Image Viewer Patient Search



The clinician
can search for
the patient
using the
Patient's
Name,
FMP/SSN, SSN,
or Last Name
Initial and last
4 of SSN.

Medical Image Viewer - Patient Lookup - Microsoft Internet Explorer

Address: http://amedapwbamc0060/patientlookup.aspx?viewercontrol=true

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

MIV MEDICAL IMAGEVIEWER

Logout

Patient Lookup

Enter patient search criteria:
Search by Patient's Name, FMP/SSN, SSN or Last Name Initial with Last 4 of SSN (s1234) and press 'Lookup'.

Patient One Patient Lookup

Lookup Results

Please enter your patient search criteria in the form provided above. You may search by Patient's Name, FMP/SSN, SSN or Last Name Initial with Last 4 of SSN (s1234).

CPS

Medical Image Viewer 1.3.1.100
Complete Professional Services (CPS)

You are currently configured to use the **Enhanced Viewer**.
[Click here](#) to enable the **Standard Viewer**.

Local intranet



Medical Image Viewer Patient Selection



Patient One was found and can be selected

Medical Image Viewer - Patient Lookup - Microsoft Internet Explorer

Address: http://amedapwlbamc0060/patientlookup.aspx?viewercontrol=true

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

MIV MEDICAL IMAGEVIEWER

Logout

Patient Lookup

Enter patient search criteria:
Search by Patient's Name, FMP/SSN, SSN or Last Name Initial with Last 4 of SSN (s1234) and press 'Lookup'.

Patient One Patient Lookup

Lookup Results

Multiple patients were found that matched your search criteria. Please select the patient you wish to retrieve imagery on from the list below.

	Patient Name	SSN	FMP/SSN	Birthdate	Gender
Select	Patient One	000-00-0000	FMP/SSN	MM/DD/YYYY	F
Select	Patient Two				M
Select	Patient Three				
Select	Patient Four				M
Select	Patient Five				

CPS

Medical Image Viewer 1.3.1.100
Complete Professional Services (CPS)

Done Local intranet



Medical Image Viewer Patient Search

Thumbnails of
the images in the
series

List of
Studies

Select
Study
From
VA El
Paso

Medical Image Viewer - Patient Studies - Microsoft Internet Explorer

Address: http://amedapwbamc0060/patientdashboard.aspx

Patient: **Patient One** SSN: **000-00-0000** FMP/SSN: **FMP/SSN** DOB: **MM/DD/YY** Age: **31** Sex: **F**

Study Date: **17 Jul 2006** Study Description: **SPINE LUMBOSACRAL MIN 6 VIEWS** Study Modalities: **RAD CR** Series Count: **6** Facility: **ELP (756)**

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 1

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 2

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 3

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 4

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 5

SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 6

Single View Add To MultiView

Single View Add To MultiView

Single View Add To MultiView

Single View Add To MultiView

Single View Add To MultiView

Single View Add To MultiView

MultiView Layout

You currently do not have any series selected for multiview.

Images can be
selected and
viewed in
Single or
MultiView
Layout



Medical Image Viewer Patient Search

Thumbnails of the images in the series

Added four sequences to view in MultiView.

List of Studies

Select Study From VA El Paso

Medical Image Viewer - Patient Studies - Microsoft Internet Explorer

Address: http://amedapwbamc0060/patientdashboard.aspx

Patient: **One** SSN: 000-00-0000 FMP/SSN: MM/DD/YYYY Age: 31 Sex: F

Buttons: Patient Lookup, Logout

Studies

- ABDOMEN SERIES, ACUTE
5 Series CR
21 Sep 2006
William Beaumont AMC
- CHEST 2 VIEWS PA&LAT
2 Series RAD CR
17 Jul 2006
ELP (756)
- SPINE LUMBOSACRAL MIN 6 VIEWS
6 Series RAD CR
17 Jul 2006
ELP (756)
- SPINE LUMBOSACRAL MIN 6 VIEWS
1 Series RAD CR
25 Mar 2005
ELP (756)
- SPINE THORACOLUMBAR 2 VIEWS
1 Series RAD CR
27 Aug 2003
William Beaumont AMC
- ABDOMEN SERIES, ACUTE
2 Series CR
27 Aug 2003
William Beaumont AMC

Displaying 1 to 6 of 12

Series Gallery

Study Date: 17 Jul 2006 Study Description: SPINE LUMBOSACRAL MIN 6 VIEWS Study Modalities: RAD CR Series Count: 6 Facility: ELP (756)

Sequence #	Thumbnail	Buttons
1		Single View, Add To MultiView
2		Single View, Add To MultiView
3		Single View, Add To MultiView
4		Single View, Add To MultiView
5		Single View, Add To MultiView
6		Single View, Add To MultiView

MultiView Layout

Buttons: Open MultiView, Unselect All, Remove All

- 17 Jul 2006 SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 1
Move To: 2 3 4
- 17 Jul 2006 SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 3
Move To: 1 3 4
- 17 Jul 2006 SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 6
Move To: 1 2 4
- 17 Jul 2006 SPINE LUMBOSACRAL MIN 6 VIEWS Sequence # 5
Move To: 1 2 3

Local intranet

Images can be reordered and removed from MultiView



Medical Image Viewer Patient Search

VA Images are displayed in MultiView along with the related VA radiology text report.

Medical Image Viewer - Imagery Viewer - Microsoft Internet Explorer

Address: <http://amedapwbamc0060/viewer.aspx?pl=08d0851c-e8ee-4f99-80a4-18bbdc1867f5&p1c=1>

Back Forward Stop Home Search Favorites Print Mail

Patient: **000-00-0000** FMP/SSN: **MM/DD/YYYY** Age: **31** Sex: **F**

Close

Series Information

SPINE LUMBOSACRAL MIN 6 VIEWS
17 Jul 2006
[View Report](#)

SPINE LUMBOSACRAL MIN 6 VIEWS -- Web Page Dialog

1^SPINE LUMBOSACRAL MIN 6 VIEWS^
Group ID#

DOB- 1976 F
Exam Date: JUL 17, 2006@16:05
Req Phys: E Pat Loc: ZZZSPEC I-WMN'S HLTH
Img Loc: RADIOLOGY
Service: Unknown

(Case 125 COMPLETE) SPINE LUMBOSACRAL MIN 6 VIEWS (RAD Detailed)
CPT:72114
Proc Modifiers : N/A, TECHNICAL COMPONENT

Clinical History:
30 YO FEMALE VET, HX OF PAIN, OSTEOPOROSIS

Report Status: Verified Date Reported: JUL 17, 2006
Date Verified: JUL 17, 2006
Verifier E-Sig:/ES/A

Report:

<http://amedapwbamc0060/viewerreport.aspx?series=et> Local intranet

javascript:modelesswin('viewerreport.aspx?series=eb24327a-36db-4c9a-aa49-e9b4a086d14f&desc=SPINE+LUMBOSACRAL+MIN+6+VIEWS',500,4) Local intranet

The text report box can be moved to uncover images and closed to view all images.



VA/DOD Medical Images Viewed Side by Side



Medical Image Viewer - Imagery Viewer - Microsoft Internet Explorer

File Edit View Favorites Tools Help Address <http://amedapwbamc0060/viewer.aspx?p1=35e7c67a-3de3-44dc-bc48-8479ba3104d3&p1c=39&p2=ca1f8073-653b-44dd-b4af-93fe38ba4461&p2c=> Go

Back Search Favorites

Patient: SSN: FMP/SSN: DOB: 25 Oct 1921 Age: 85 Sex: M Close

Series Information

CT ABDOMEN W/O CONT

16 Apr 2007

[View Report](#)

Prev Play Next

Slice 1 : 39



Series Information

CHEST PA/LAT

17 Oct 2006

[View Report](#)

Prev Play Next

Slice 1 : 2



Done Local intranet



VA/DOD Medical Image Reports Viewed Side by Side



Medical Image Viewer - Imagery Viewer - Microsoft Internet Explorer

Address: <http://amedapnibanc0060/viewer.aspx?p1=35e7c67a-3de3-44d3-bc4b-8479ba310433p1c=396p2=ca1f0073-653b-445b-84af-93fe30ba4618p2c=>

Ref: [REDACTED] SSN: [REDACTED] EMD/PSN: [REDACTED] DOB: 25 Oct 1921 Age: 85 Sex: M

Series Information

CT ABDOMEN W/O CONT
16 Apr 2007
[View Report](#)

Prev Play Next
Slice 1 : 39

CT ABDOMEN W/O CONT - Web Page Dialog

1 CT ABDOMEN W/O CONT
[REDACTED]
DOB: OCT 25, 1921 M
Reg Phys: ASCHERL, MARTIN VINCENT Pat Loc: HEMA/ONCO/ASCHERL (Reg Loc)
Img Loc: CAT SCAN-DROUTSAS
Service: Unknown

(Case 12 COMPLETE) CT ABDOMEN W/O CONT (CT Detailed) CPT:74150

Clinical History:
85 YO MAN WITH MACROCYTIC ANEMIA, PROBABLY DUE TO ANEMIA OF CHRONIC RENAL DISEASE, +/-HEMOLYSIS, B12 DEFICIENCY, IRON DEFICIENCY. COLO DONE 3/07--HEMORRHOIDS

WEIGHT LOSS, EARLY SATIETY, R/O UGI LESION

ASCITES, R/O LIVER DISEASE

RENAL DISEASE, NO CONTRAST

<http://amedapnibanc0060/viewerreport.aspx?series=3f> Local intranet

Series Information

CHEST PA/LAT
17 Oct 2006
[View Report](#)

Prev Play Next
Slice 1 : 2

CHEST PA/LAT - Web Page Dialog

COMPARISON STUDY: Chest radiograph obtained 26 July 2006 and 21 May 2006.

FINDINGS: PA and lateral chest radiographs demonstrate mild linear opacity within the left base. There is indistinctness to the pulmonary vasculature and increased interstitial markings bilaterally. The cardiac silhouette is not significantly changed. There is persistent elevation of the right hemidiaphragm. Degenerative change is again noted of the spine, and there is atherosclerotic vascular disease noted within the thoracic aorta.

IMPRESSION:

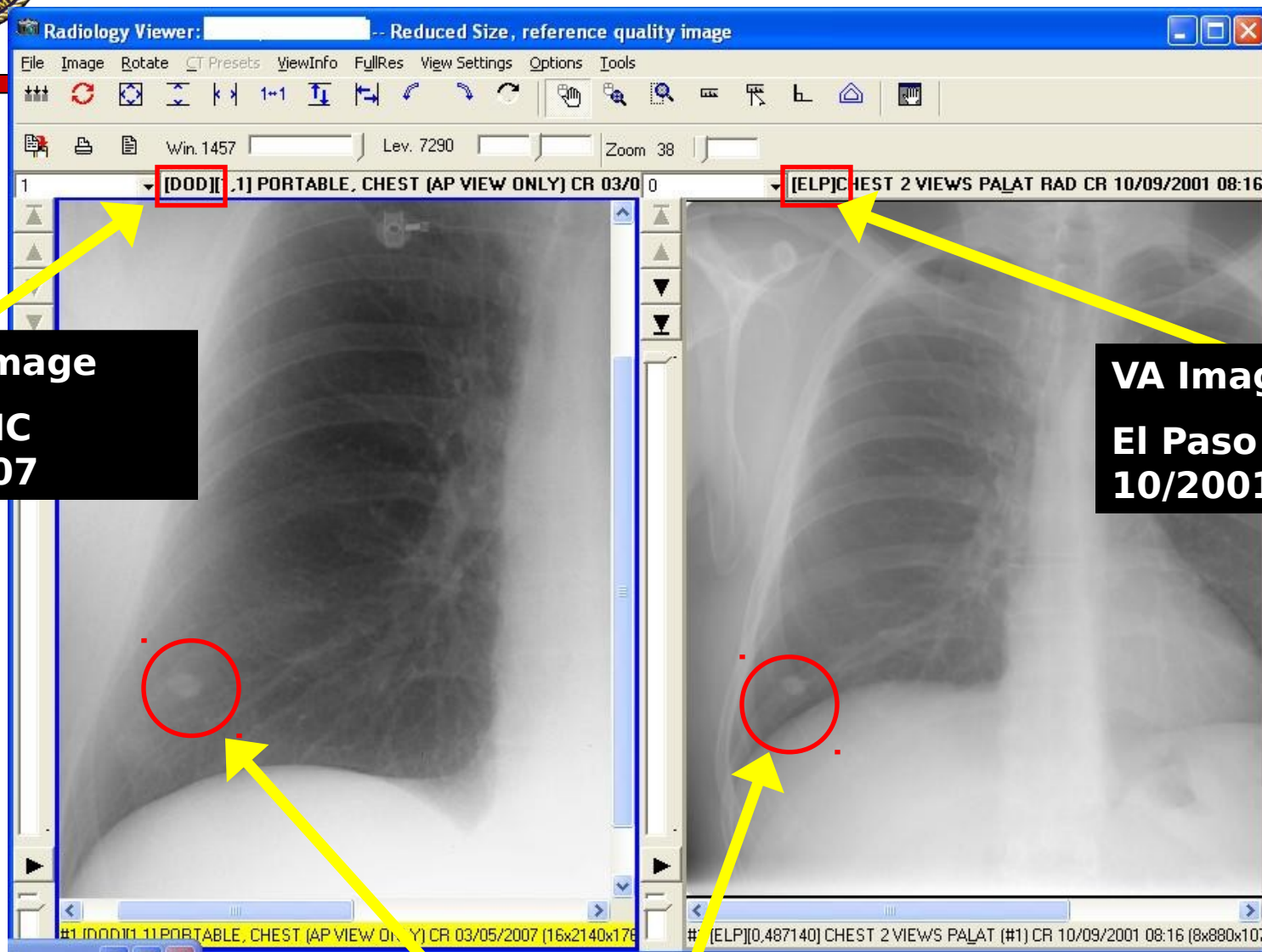
1. LINEAR OPACITY WITHIN THE LEFT BASE LIKELY REPRESENTS ATELECTASIS OR SCARRING. THIS COULD REPRESENT A DEVELOPING PNEUMONIA.
2. FINDINGS CONSISTENT WITH MILD INTERSTITIAL PULMONARY EDEMA. RECOMMEND FOLLOW-UP PA AND LATERAL CHEST RADIOGRAPH AFTER TREATMENT TO ASSURE RESOLUTION OF THESE FINDINGS.

06493/b
DOD: 17 OCT 2006

<http://amedapnibanc0060/viewerreport.aspx?series=c1> Local intranet



Demonstration: Viewing DOD Images at the VA



DoD Image
WBAMC
03/2007

VA Image
El Paso
10/2001

Area of Clinical



QUESTIONS